State Board of Education Approved
February 2002

TRANSPORTATION CORE

The *Transportation Core* course prepares students for entry into all subsequent transportation courses. Students explore career opportunities and requirements of a professional service technician. Content emphasizes beginning transportation service skills and workplace success skills. Students study safety, tools, equipment, shop operations, and basic technician skills. Upon completing this course students may enter automotive service technology, diesel equipment maintenance technology, leisure craft service technology, collision repair and refinish technology, or aviation maintenance.

Prerequisite: None

Note: Career Management Success is required as a part of the Trade and Industrial student's concentrator sequence or technical path in the Manufacturing, Construction, and Transportation sub-clusters.

Recommended Credits: ½

Recommended Grade Level: 9th, **10**th

Note: **(1)** Hours earned in the *Transportation Core* course may be used toward meeting NATEF standards and Tennessee Department of Education standards.
(2) Standards 1 through 7 are for 1/2 credit. Standard 8 is for an additional 1/2 credit.

State Board of Education Approved
February 2002

TRANSPORTATION CORE STANDARDS

1.0 Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

2.0 Students will explore the transportation service industry and its career opportunities.

3.0 Students will demonstrate communication skills required in the transportation service industry.

4.0 Students will apply mathematics and science knowledge and skills to transportation service technology.

5.0 Students will demonstrate transportation service technology safety practices, including Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) requirements for transportation service and repair facilities.

6.0 Students will identify and properly use, maintain, and store basic transportation service hand and power tools and equipment.

7.0 Students will demonstrate interpersonal and employability skills required in the transportation service industry.

8.0 Students will examine basic functions and operations of vehicle components and their maintenance and repair.

TRANSPORTATION CORE

STANDARD 1.0

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

LEARNING EXPECTATIONS

The student will:
1.1 Cultivate positive leadership skills.
1.2 Participate in SkillsUSA-VICA as an integral part of classroom instruction.
1.3 Assess situations and apply problem-solving and decision-making skills to particular client relations in the community and workplace.
1.4 Analyze the points of the SkillsUSA-VICA creed and purposes.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
1.1.A Demonstrates an honest character, leadership, and integrity.
1.1.B Develops creative and critical-thinking skills.
1.2.A Becomes an active member in Tennessee SkillsUSA-VICA.
1.2.B Participates and conducts meetings and other business according to accepted rules of parliamentary procedure.
1.2.C Illustrates the parts of the SkillsUSA-VICA emblem and comprehends the meaning of each part.
1.3 Analyzes situations in the classroom and uses problem-solving techniques to solve the problem.
1.4.A Applies the points of the creed to personal and professional situations.
1.4.B Applies the purposes to personal and professional situations.

SAMPLE PERFORMANCE TASKS

- Participates in a community service project.
- Serves on local chapter committee for SkillsUSA-VICA.
- Create a leadership inventory and use it to conduct a personal assessment.
- Participate in various SkillsUSA-VICA programs and/or competitive events.
- Evaluate an activity within the school, community, and/or workplace and project effects of the project.
- Implement an annual program of work.
- Prepare a meeting agenda for a SkillsUSA-VICA monthly meeting.
- Attend a professional organization meeting.
- Assist with an officer campaign with Tennessee SkillsUSA-VICA.

INTEGRATION LINKAGES

SkillsUSA-VICA, *Professional Development Program,* SkillsUSA-VICA, Communications and Writing Skills, Teambuilding Skills, Research, Language Arts, Sociology, Psychology, Math, Math for Technology, Applied Communications, Social Studies, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, SCANS (Secretary's Commission on Achieving Necessary Skills), Chamber of Commerce, Colleges, Universities, Technology Centers, and Employment Agencies

TRANSPORTATION CORE

STANDARD 2.0

Students will explore the transportation service industry and its career opportunities.

LEARNING EXPECTATIONS

The student will:

2.1 Trace the growth and development of the transportation service industry.
2.2 Evaluate career paths within the transportation service industry.
2.3 Evaluate personal characteristics required for success in the transportation service industry.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

2.1.A Designs a project illustrating the history of the transportation service industry.
2.1.B Categorizes changes in the transportation service industry and analyzes the effects of the changes.
2.1.C Predicts future trends in the transportation service industry.
2.1.D Evaluates the effect of computerization and electronic components on the transportation service industry.
2.2.A Compares roles, functions, and potential earnings of transportation service occupations.
2.2.B Diagrams potential career paths within the transportation service industry.
2.2.C Charts a projected plan for continuous education in a select transportation service industry.
2.3.A Profiles personality and physical traits needed for personal success in the transportation service industry.
2.3.B Incorporates professional terminology into conversations during training activities.

SAMPLE PERFORMANCE TASKS

- Research industry history and trends using the Internet, media, interviews, and other sources.
- Develop a timeline of significant events in the transportation service industry.
- Develop a profile of career opportunities.
- Create a personal career plan.

INTEGRATION LINKAGES

Career Guidance, Communication Skills, Teamwork Skills, Computer Skills, Research and Writing Skills, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, National Automotive Technician Education Foundation (NATEF), SkillsUSA-VICA, Automotive Youth Education System (AYES)

TRANSPORTATION CORE

STANDARD 3.0

Students will demonstrate communication skills required in the transportation service industry.

LEARNING EXPECTATIONS

The student will:

3.1 Communicate and comprehend oral and written information typically occurring in the transportation service workplace.
3.2 Solve problems and make decisions using a logical process.
3.3 Use teamwork skills to accomplish goals, solve problems, and manage conflict within groups.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

3.1.A Interprets and uses written information in common job formats, such as tables, charts, and reference materials and manuals.
3.1.B Interprets and uses graphical information such as blueprints, electrical schematics, process control schematics, diagnostic flow charts, and other transportation service diagrams.
3.1.C Uses electronic resources to obtain service and other transportation information.
3.1.D Analyzes information obtained from various sources to determine a diagnostic approach.
3.1.E Communicates clearly and appropriately in oral and written form.
3.1.F Interprets a repair order.
3.1.G Evaluates various manufacturers recommended maintenance schedules.
3.2.A Develops a hypothesis regarding the cause of a problem.
3.2.B Tests the hypothesis to determine the solution to the problem.
3.2.C Creates, evaluates, and revises as needed a plan to resolve a problem.
3.2.D Participates in a strategy-based diagnostic process using case scenarios.
3.3.A Serves in each of the functional roles of a team.
3.3.B Points out benefits and problems that may arise from diversity in the transportation service workplace, including manufacturer tools and cultural differences.
3.3.C Demonstrates appropriate and positive examples of giving and accepting criticism.
3.3.D Modifies behavior and revises work habits based on appropriate criticism.
3.3.E Solves problems in cooperation with other members of a group.
3.3.F Evaluates the role of the transportation service technician within the organizational system of a dealership or fleet shop.

SAMPLE PERFORMANCE TASKS

- Complete repair orders for various operations.
- Role-play and analyze methods of conflict resolution.
- Measure tread depth and tire wear. Make determinations based on measurement.
- Use blueprints and diagrams to execute a task.
- Using case scenarios, practice strategy based diagnostic procedure:
  Verify the complaint.
  Define the problem.
  Isolate the problem.
  Validate the problem.
  Make the repair.
  Test the repair.

INTEGRATION LINKAGES

Career Guidance, Communication Skills, Teamwork Skills, Computer Skills, Research and Writing Skills, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, National Automotive Technician Education Foundation (NATEF), SkillsUSA-VICA, Automotive Youth Education System (AYES)

TRANSPORTATION CORE

STANDARD 4.0

Students will apply mathematics and science knowledge and skills to transportation service technology.

LEARNING EXPECTATIONS

The student will:

4.1 Perform mathematical calculations and measurements commonly used in the transportation service workplace.
4.2 Apply basic principles of chemistry to transportation service technology including automotive, diesel, motorcycle, all terrain vehicles, and watercraft.
4.3 Apply basic principles of physics to transportation service technology including automotive, diesel, motorcycle, all terrain vehicles, and watercraft.
4.3 Use the scientific process to determine the solution to a problem.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

4.1.A Compares actual readings taken from a vehicle with manufacture specifications.
4.1.B Uses flat rate and hours earned to calculate technician's pay.
4.1.C Chooses the appropriate measurement tool for the requirements of a given measurement.
4.1.D Accurately reads and interprets data from measurement tools used in transportation service technology.
4.1.E Performs accurate general and precision measurements and calculations.
4.1.F Uses and converts common units of measurement across measurement systems (metric and English, Celsius and Fahrenheit).
4.2.A Determines the chemical principles associated with automotive, diesel, motorcycle, all terrain vehicle, and watercraft operating systems and collision paint and refinish technology.
4.2.B Compares the properties and reactions of various chemicals used in automotive, diesel, motorcycle, all terrain vehicle, and watercraft operating systems and collision paint and refinish technology.
4.2.C Correlates basic chemical concepts with automotive, diesel, motorcycle, all terrain vehicle, and watercraft operating systems and collision paint and refinish technology.
4.2.D Researches alternative fuels for use in automotive, diesel, motorcycle, all terrain vehicle, and watercraft engines.
4.3.A Illustrates the applications of basic physics concepts to automotive, diesel, motorcycle, all terrain vehicle, and watercraft operating systems and collision paint and refinish technology, such as Ohm's law, and Paschal's law of thermal dynamics.

4.3.B Illustrates the role and use of optics and lasers in transportation monitoring systems.
4.3.C Explains the role of Global Positioning Satellite systems in the transportation service industry.
4.3.D Explains telematic communication systems via satellite.
4.4.A Develops a hypothesis regarding the cause of a problem and tests the hypothesis to determine the solution to a problem.
4.4.B Gathers and analyzes data.
4.4.C Maintains documentation of problems and procedures.
4.4.D Supports conclusions with evidence.

SAMPLE PERFORMANCE TASKS

- Determine if a brake rotor is within specifications.
- Read a thermometer. Determine temperature accurately using infrared thermal measuring device.
- Use a dial indicator to measure total indicator runout (TIR).
- Use a transportation scan tool to retrieve diagnostic trouble codes (DTC).
- Obtain digital multimeter (DMM) readings.
- Develop an integrated project with a chemistry class to show the chemical breakdown of fluids such as brake fluid, motor oil, antifreeze, power steering, transmission fluid, and battery acid. Develop a presentation about why fluids must be changed in the vehicle.
- Develop the chemical formula showing the chemical process of the burning of fuel in an engine. Show the chemical formula efficiency of an internal combustion engine.
- Show the efficiency of an engine by evaluating the intake of the catalytic converter and the exhaust.
- Develop an integrated project with a physics class to demonstrate principles of physics incorporated in the operating systems of a vehicle. Develop a presentation that depicts the vehicle as a rolling physics lab. Share the presentation with school and community groups.
- Develop a presentation with a physics and science class to show the present and future use of telematic communication systems in the transportation industry. Research knowledge and skill necessary for the technician to service telematic communication systems and global positioning satellite systems. Share the presentation with school and community groups.

INTEGRATION LINKAGES

Career Guidance, Communication Skills, Teamwork Skills, Computer Skills, Research and Writing Skills, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, National Automotive Technician Education Foundation (NATEF), SkillsUSA-VICA, Automotive Youth Education System (AYES)

TRANSPORTATION CORE

STANDARD 5.0

Students will demonstrate transportation service technology safety practices, including Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) requirements for transportation service and repair facilities.

LEARNING EXPECTATIONS

The student will:

5.1 Determine the safe and correct application for chemicals used in a transportation service and repair facility.
5.2 Use protective clothing and safety equipment.
5.3 Use fire protection equipment.
5.4 Follow OSHA and EPA regulations affecting transportation service technology.
5.5 Respond to safety communications.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

5.1.A Conforms to federal, state, and local regulations when handling, storing, and disposing of chemicals.
5.1.B Ensures proper ventilation for chemical use.
5.1.C Locates first aid supplies.
5.1.D Passes a written safety examination with 100% accuracy.
5.1.E Passes a performance examination on equipment with 100% accuracy.
5.1.F Maintains a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.
5.2.A Demonstrates proper usage of special safety equipment.
5.2.B Selects and uses the appropriate protective clothing for a given task.
5.2.C Demonstrates the use of eye protection.
5.3.A Distinguishes the proper fire extinguisher for each class of fire.
5.3.B Demonstrates the proper use of a fire extinguisher.
5.4.A Locates regulatory information.
5.4.B Extracts information from Material Safety Data Sheets (MSDS) pertaining to chemicals used in transportation service technology.
5.4.C Complies with relevant regulations and standards.
5.5.A Interprets safety signs and symbols.
5.5.B Complies with safety signs and symbols.
5.5.C Reads and interprets manufacturer recall information and makes determinations pertaining to transportation service industry.

SAMPLE PERFORMANCE TASKS

- Assess the work area for safety hazards.
- Design a correction program for identified hazards.
- Model the appropriate protective equipment for an assigned task.
- Using case scenarios, interpret manufacturer recall information. Develop presentation on cause and effects of safety issues involved.

INTEGRATION LINKAGES

Math, Science, Communication Skills, Teamwork Skills, Reading Skills, Leadership Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), SkillsUSA-VICA, Automotive Youth Education System (AYES)

TRANSPORTATION CORE

STANDARD 6.0

Students will identify and properly use, maintain, and store basic transportation service hand and power tools and equipment.

LEARNING EXPECTATIONS

The student will:

6.1 Identify and illustrate the function of common transportation hand and power tools.
6.2 Properly use transportation hand and power tools and service and diagnostic equipment.
6.3 Properly maintain and store transportation hand and power tools.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

6.1.A Distinguishes common transportation hand and power tools.
6.1.B Selects and demonstrates the proper use of the appropriate tool for a given task.
6.2.A Demonstrates safety procedures for the use of hand and power tools and of service and diagnostic equipment.
6.2.B Demonstrates how to use tools to perform maintenance, fabrication, or installation tasks.
6.2.C Demonstrates acceptable procedures for safe use, maintenance, and storage of shop equipment.
6.2.D Reads and comprehends manufacturers' equipment manuals.
6.3.A Demonstrates proper care and maintenance procedures for transportation hand and power tools and service and diagnostic equipment.
6.3.B Demonstrates proper storage procedures for transportation hand and power tools and service and diagnostic equipment.
6.3.C Maintains tools and equipment control and inventory.

SAMPLE PERFORMANCE TASKS

- Demonstrate the use of a torque wrench.
- Use hand and power tools without damage to tools, fasteners, or parts.
- Safely use an electric or hydraulic lift to raise a vehicle.
- Use a wheel balancer, machine lathe, and grease gun.
- Use a handheld scanner to perform diagnostics on a vehicle.
- Maintain tool and equipment inventory to prevent loss or theft.
- Attend a trade show or manufacturer showroom or dealership to view and discuss equipment used in the transportation service industry.

INTEGRATION LINKAGES

Math, Science, Communication Skills, Teamwork Skills, Reading Skills, Leadership Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), SkillsUSA-VICA, Automotive Youth Education System (AYES)

TRANSPORTATION CORE

STANDARD 7.0

Students will demonstrate interpersonal and employability skills required in the transportation service industry.

LEARNING EXPECTATIONS

The student will:

7.1 Infer relationships between work ethics, organizational skills, and personal job success.
7.2 Demonstrate attitudes conducive to workplace success.
7.3 Maintain a neat and orderly work area.
7.4 Assess implications of diversity for communities and workplaces.
7.5 Exhibit positive employability behaviors.
7.6 Develop individual time management and work sequencing skills.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

7.1.A Illustrates the concept of "work ethics."
7.1.B Assesses the potential impact of an individual's work ethic on the class, laboratory, and work place.
7.1.C Comprehends the relationship between work ethics and personal job success.
7.2.A Judges which personal attitudes are conducive to success.
7.2.B Modifies behavior to reflect attitudes for success.
7.2.C Calculates the cost of poor work ethics to the individual and to the workplace.
7.3.A Keeps work area, tools, and equipment organized and free from clutter.
7.3.B Cleans work area, tools, and equipment according to shop standard.
7.3.C Deduces the correlation between a clean orderly work environment and successful and efficient job performance.
7.4.A Devises solutions to problems arising from cultural diversity.
7.4.B Devises and implements conflict resolution management strategies.
7.5.A Demonstrates proper dress and grooming for work in a transportation service facility.
7.5.B Exhibits enthusiasm for learning and continuing education for employment in a transportation service facility.
7.5.C Communicates with peers, management, and clients in the transportation service facility.
7.6.A Assesses the benefits of incorporating time management principles into work in the transportation service industry.
7.6.B Displays time management and work sequencing skills in class assignments.
7.6.C Implements job sequencing skills in a transportation service facility.
7.6.D Calculates salary based on good time management, job sequencing, and service writing skills.

SAMPLE PERFORMANCE TASKS

- Explain hazards associated with improper dress.
- Research cultural diversity and equity issues impacting the transportation service industry.
- Divide into groups of four to six. Each group is given a different scenario of a transportation service workplace situation in which an employee demonstrates a poor work ethic. The group identifies the problem and all the possible ramifications of the individual's behavior for the organization, other employees, and the employee him/herself. Have each group present its scenario and analysis to the class. Presentation should include corrective measures.

INTEGRATION LINKAGES

Math, Science, Communication Skills, Teamwork Skills, Reading Skills, Leadership Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), SkillsUSA-VICA, Automotive Youth Education System (AYES)

TRANSPORTATION CORE

STANDARD 8.0

Students will examine basic functions and operations of vehicle components and their maintenance and repair.

LEARNING EXPECTATIONS

The student will:
8.1 Examine the functions and operations of basic vehicle components.
8.2 Demonstrate basic preventive maintenance and repair procedures.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
8.1.A Locates and identifies the basic components of a vehicle.
8.1.B Evaluates the functions and operations of basic components of a vehicle.
8.2.A Interprets manufacturer service information and determines required maintenance for a vehicle component.
8.2.B Employs acceptable industry standard procedures while performing preventive vehicle maintenance such as oil changes, coolant system flushes, transmission fluid changes, and filter replacements.
8.2.C Follows repair manual procedures to diagnose and correct simple malfunctions in basic automotive/diesel/motorcycle/all terrain vehicle/boat functions.
8.2.D Maintains preventive maintenance service records.
8.2.E Completes work orders, calculates client charges, and schedules future preventative maintenance service.

SAMPLE PERFORMANCE TASKS

- Illustrate the function of a major automotive/diesel/motorcycle/all terrain vehicle/boat component.
- Illustrate the function of a major small engine component.
- Adjust v-belt tension using a tension gauge.
- Test and replace defective lamps, windshield wipers, fuses, and belts.

INTEGRATION LINKAGES

Math, Science, Communication Skills, Teamwork Skills, Reading Skills, Leadership Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), SkillsUSA-VICA, Automotive Youth Education System (AYES)

TRANSPORTATION CORE

SAMPLING OF AVAILABLE RESOURCES

Development Guidance: Classroom Activities, Center on Education and Work, Madison, Wisconsin

A0 Fundamentals of Transportation Service Technology Course, AYES Curriculum: A Tenth Grade Course, AYES Corporation, www.ayes.org

Introduction to Transportation Service Technology, Service Series, Curriculum and Instructional Material Center (CIMC), Oklahoma Department of Vocational and Technical Education

Module 1 Introduction to Transportation Technology, Instructional Materials Laboratory (IML), University of Missouri

Today's Technician Basic Transportation Service & Systems, Webster & Owens, Delmar/ITP

1999 Automobile Task List, National Automotive Technicians Education Foundation (NATEF), www.natef.org

General Motors Diagnostic Plan

Ford Motor Company Diagnostic Plan

Harley Davidson Institute

Snap-on Tools Education and Technical Divisions